AMENDMENTS

In the claims:

Please amend the claims as follows:

1. (Currently Amended) A magnetic resonance imaging method for producing one or more magnetic resonance images of a region of a subject, comprising the steps of:
- applying a uniform magnetic field to the subject,
- applying a gradient field to the subject,
- acquiring spatially encoded magnetic resonance signals from one or more receiver antennae, and
- reconstructing the image from the spatially encoded magnetic resonance signals, said reconstructing including ~~wherein spatially encoded undersampled magnetic resonance signals are acquired by one or more receiver antennae and one or more images are reconstructed from the spatially encoded undersampled magnetic resonance signals as a result of~~ optimizing a [[the]] spatial response function (SRF) individually for each pixel in the image, wherein the SRF is ~~, which is~~ defined by the spatial signal response from the subject ~~object~~ to be imaged~~, individually for each pixel of an image~~.

2. (Currently Amended) A magnetic resonance imaging method according to claim 1, wherein the spatial encoded magnetic resonance signals are acquired in an undersampled fashion. ~~encoding is provided by the spatial sensitivity profiles of the receiver antenna system, by gradient encoding, by RF encoding, by any spatial variation of magnetization or precession frequency, such as from inhomogeneity of the main magnetic field, or by any combination of the above encoding mechanisms.~~

3. (Previously Presented) A magnetic resonance imaging method according to claim 1, wherein the spatial response function is optimized individually for each pixel

by minimizing a cost function, which determines the deviation of the spatial response function from a target spatial response function specified individually for each pixel.

4. (Original) A magnetic resonance imaging method according to claim 3, wherein the cost function is determined by a norm of the deviation of the spatial response function after an optional linear mapping, wherein the specific choices of linear mapping and norm can be chosen individually for each pixel.

5. (Original) A magnetic resonance imaging method according to claim 4, wherein the norm is a p-norm.

6. (Previously Presented) A magnetic resonance imaging method according claim 4, wherein an iterative algorithm is applied for optimization of the cost function.

7. (Currently Amended) A magnetic resonance imaging method according to claim 3 ~~claim 1~~, wherein the shape of the spatial response function is optimized jointly with a [[the]] noise level in a [[the]] final image, and wherein ~~optionally~~ the cost function for each pixel is modified to additionally include a noise statistic for each pixel. ~~the noise statistics of the pixel.~~

8. (Currently Amended) A magnetic resonance imaging method according to claim 7, wherein the cost function is a sum or a sum of squares of one term measuring the spatial response function[[SRF]] deviation, and one term measuring noise statistics~~, with or without weighting in the summation~~.

9. (Currently Amended) A magnetic resonance imaging method according to claim 7, wherein an [[the]]estimate of the noise level is based on the noise covariance of the input data.

10. (Previously Presented) A magnetic resonance imaging method according to claim 1, wherein the spatial response functions are discretized with a sufficiently high

resolution to capture all significant features of target and actual SRFs, the latter of which is determined by the resolution of the acquired data.

11. (Previously Presented) A magnetic resonance imaging method according to claim 1, wherein the optimization of the spatial response function is weighted within the object to be imaged.

12. (Currently Amended) A magnetic resonance imaging method according to claim 1, wherein optimizing the spatial response function includes arranging a plurality of target response functions that have a distinctive peak at their respective voxel centers [[,]]and are arranged in any pattern~~, are applied for optimization of the spatial response function~~.

13. (Currently Amended) A magnetic resonance imaging method according to [[as in]] claim 1 wherein a ~~where any of the choices for the~~ linear transform or norm is used in measuring a [[SRF]] deviation of the spatial response function~~, the target SRFs, the pattern and density of the discretization~~ is based on an estimate of one of the signal distribution, a [[or]] covariance in the object, a covariance in a [[or in]] reference image data, ~~or based on~~ an anatomical side information, and a [[or]] physiological side information.

14. (Currently Amended) A magnetic resonance imaging system for providing a magnetic resonance image of a region of a subject comprising:
- a static main magnet having a main magnetic field,
- means for applying a read gradient and other gradient fields,
- at least one receiver antenna,
- means for measuring MR signals along a predetermined trajectory containing a plurality of lines in *k*-space, and ~~*k*-space~~
- means for reconstructing the image from the spatially encoded magnetic resonance signals, which reconstruction results from optimizing the spatial response function (SRF) individually for each pixel in the image, wherein the

SRF is defined by the spatial signal response from the region of the subject to be imaged.

~~- a receiver antenna system having at least one receiver antenna for acquiring undersampled MR signals, each receiver antenna position having a spatial sensitivity profile,~~

~~- means for reconstruction the image from the undersampled magnetic resonance signals, and~~

~~- means for optimization of a cost function, which determines the deviation of the spatial response function from a target spatial response function specified individually for each pixel of an image and/or its corresponding noise statistics.~~

15. (Currently Amended) A computer application ~~program product~~ stored on a computer-readable~~computer usable~~ medium for producing successive magnetic resonance images of a region of a subject, the computer application comprising executable instructions to: ~~forming an image by means of a magnetic resonance method comprising a computer readable program means for causing the computer to control the execution of:~~

- apply a uniform magnetic field to the subject,

- apply[[ing]] a read gradient and other gradient fields to the subject, acquiring spatially encoded magnetic resonance signals by one or more receiver antennae, and

~~- measuring MR signals along a predetermined trajectory containing a plurality of lines in *k*-space~~

~~- acquiring undersampled MR signals from a receiver antenna system, each receiver antenna position having a spatial sensitivity profile,~~

- reconstructing an [[the]] image from the spatially encoded ~~undersampled~~ magnetic resonance signals, which reconstruction results from optimizing a spatial response function (SRF) individually for each pixel in the image, wherein the SRF is defined by the spatial signal response from the region of subject to be imaged. [[and]]

~~- optimization of a cost function, which determines the deviation of the~~

~~spatial response function from a target spatial response function specified individually for each pixel of an image and/or its corresponding noise statistics.~~

16. (New) A magnetic resonance imaging system according to claim 14, wherein said means for reconstructing the image include means for optimization of a cost function, which determines the deviation of the spatial response function from a target response function specified individually for each pixel of the image and/or a noise statistic corresponding thereto.

17. (New) A computer application according to claim 15, wherein the spatial response functions are optimized by means of a cost function which determines the deviation of the spatial response function from a target spatial response function specified individually for each pixel of an image and/or a noise statistic corresponding thereto.

18. (New) A computer application according to claim 15, wherein the magnetic resonance signals are acquired in an undersampled fashion.